NASA Success Story

Built-In Plant Nutrient

A Colorado company is manufacturing zeoponic plant growth and fertilizer materials as a spinoff of NASA advanced life support technology development for use on Earth. Zeolite, a major ingredient, is a naturally occurring mineral group consisting of over 50 different minerals. Made of a special crystalline structure that is porous, but remains rigid in the presence of water, zeolites can be adapted for a variety of uses. The zeoponic plant nutrient materials developed for NASA and manufactured by ZeoponiX, Inc., are being marketed as ZeoPro(tm), a combination of a nutrient-charged zeolite and a slowly dissolving synthetic apatite that contains the nutrient phosphorus, as well as additional nutrients. The charged zeolite interacts in the plant rhizosphere with the synthetic apatite to provide nutrients in a slow release fashion through a combination of ion exchange and chemical dissolution reactions. The result is a growth medium/specialty fertilizer that when added to any other media will result in improved plant performance.

NASA Involvement NASA has been studying ways to sustain plant growth in space environments, since plants are considered critical to prolonged space exploration, supporting astronauts with water, oxygen, food, and to help recycle waste products as part of a regenerative life support system. Zeolite helped solve the problem of an efficient hydroponic system, and the term zeoponics was created. A Small Business Innovation Research (SBIR) contract joined NASA and Boulder Innovative Technologies (BIT), to develop and improve zeolite products. ZeoponiX, Inc., of Louisville, Co, was a subcontractor to BIT and was issued a license for the technology from BIT. The zeoponic science is expected to be directly applied in the International Space Station and has applications for the Advanced Life Support (ALS) Breadboard project on future missions to extraterrestrial bodies, such as Mars and the moon. Plant growth trials have used similar zeolite-based technology on the MIR missions, including those involving U.S. astronauts. Zeolite studies were also performed aboard the Space Shuttle Columbia during the second United States

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NASA Success Story

Built-In Plant Nutrient (Continued)

Microgravity Laboratory on STS-73 in September 1995. Research is being performed at the Kennedy Space Center Biomedical Office's Advanced Life Support and Gravitational Biology (ALSGB) project on plant growth and productivity. Research at the Johnson Space Center Crew and Thermal Division's Advanced Life Support Integration Test Bed is focusing on developing zeoponic amendments for ground test and space applications.

Social/Economic Benefit The initial target market for ZeoPro in the first year was golf course greens turf and specialty turf, such as playing fields. This encompasses over 16,000 golf courses, with over 400 new courses being added each year in the U.S. alone. Markets being entered include commercial greenhouses for floriculture, vegetable horticulture, and environmental horticulture (nurseries, tree farms, etc.). Differently formulated products are under design to specifically serve these markets. Consumer zeoponic products will include specialty fertilizers and growth mediums and potting mix blends. ZeoponiX has licensed the zeoponic technology to a firm in Australia and New Zealand. Other licensing inquiries have been received from firms in Asia and Europe. Distributorship arrangements have been established in many geographic areas of the U.S., as well as in Hong Kong, Singapore, and Malaysia. Other arrangements are in discussion or negotiation for the Mediterranean area, South America, and Canada. The zeoponic materials are the only known products offered that combine the benefits of superior growth media physical properties and plant demand nutrient delivery system. The products are environmentally friendly and greatly reduce the release and loss of nutrients into ground water and runoff. This results in lower overall nutrient applied to achieve equal or superior plant growth and performance. A growing awareness and increasing environmental regulations are focusing on the overuse of fertilizers and the negative impacts on the environment. Zeoponics can help alleviate this problem.

Industry Partner
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NASA Partner
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